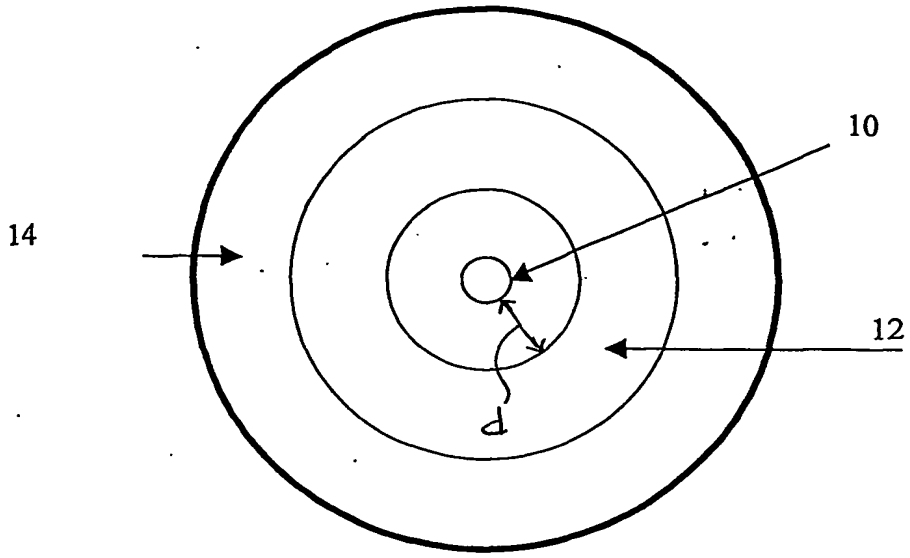


Figure 1A A Ring-Disc Sensor Assembly (not drawn to scale)

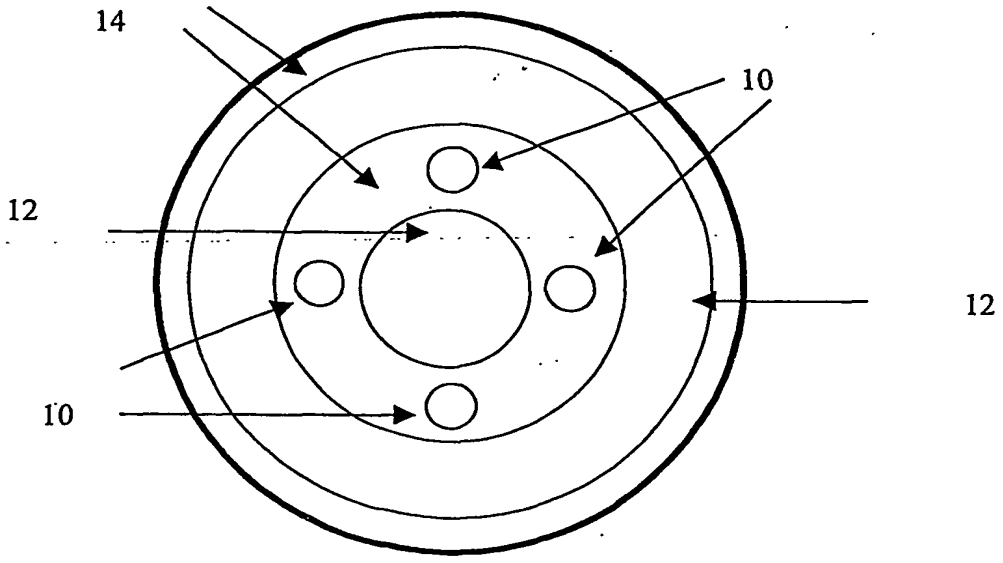


Figure 1B A Multiple Sensor Assembly (not drawn to scale)

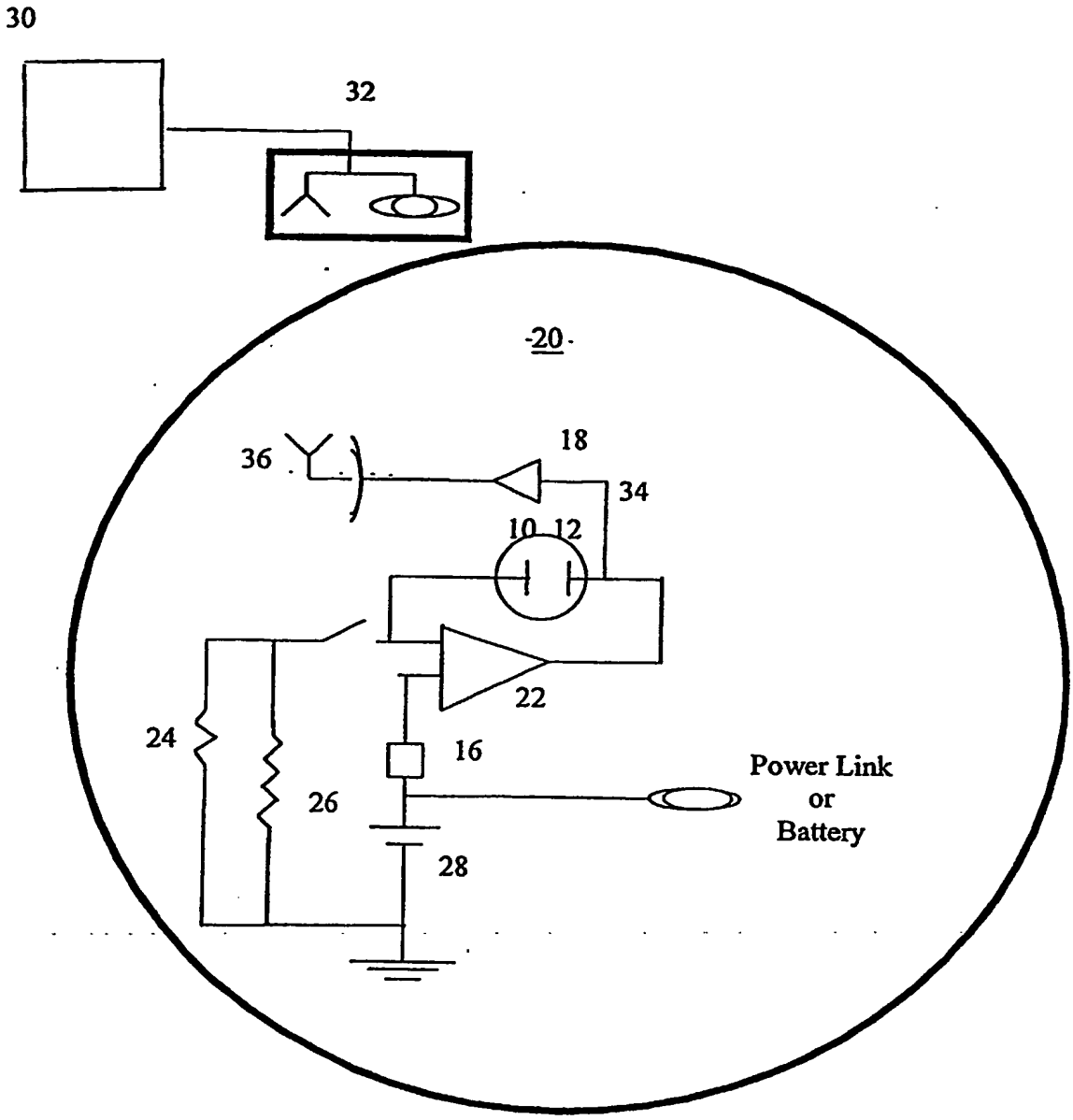


Figure 2

Figure 3

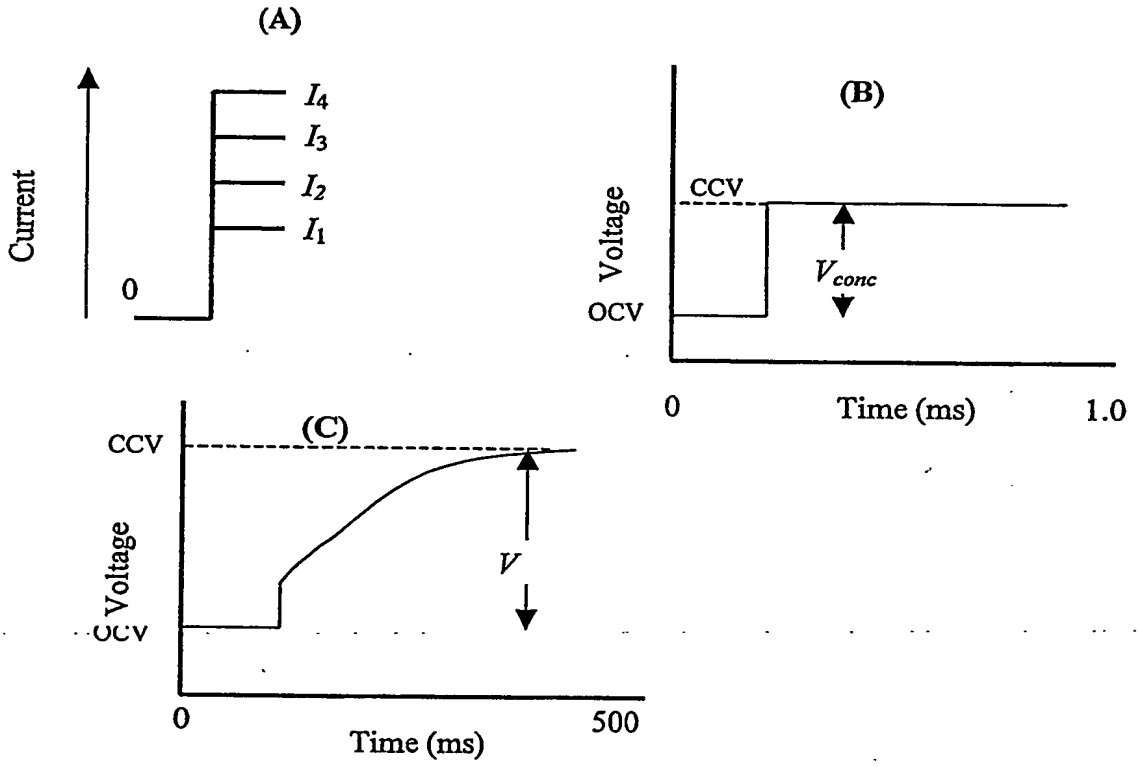
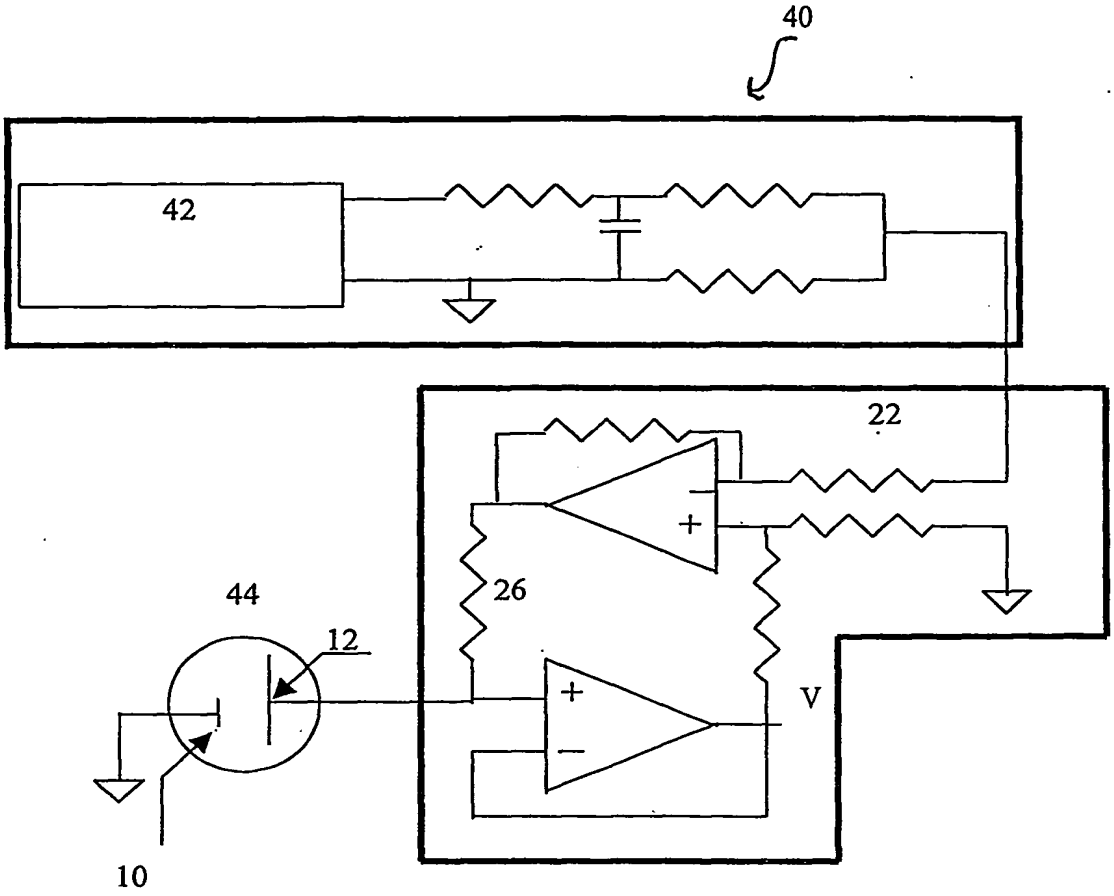

(A)
Current
I_4
I_3
I_2
I_1
0
(B)
Voltage
CCV
V_{conc}
OCV
0
Time (ms)
1.0
(C)
CCV
Voltage
V
OCV
0
500
Time (ms)

Figure 4



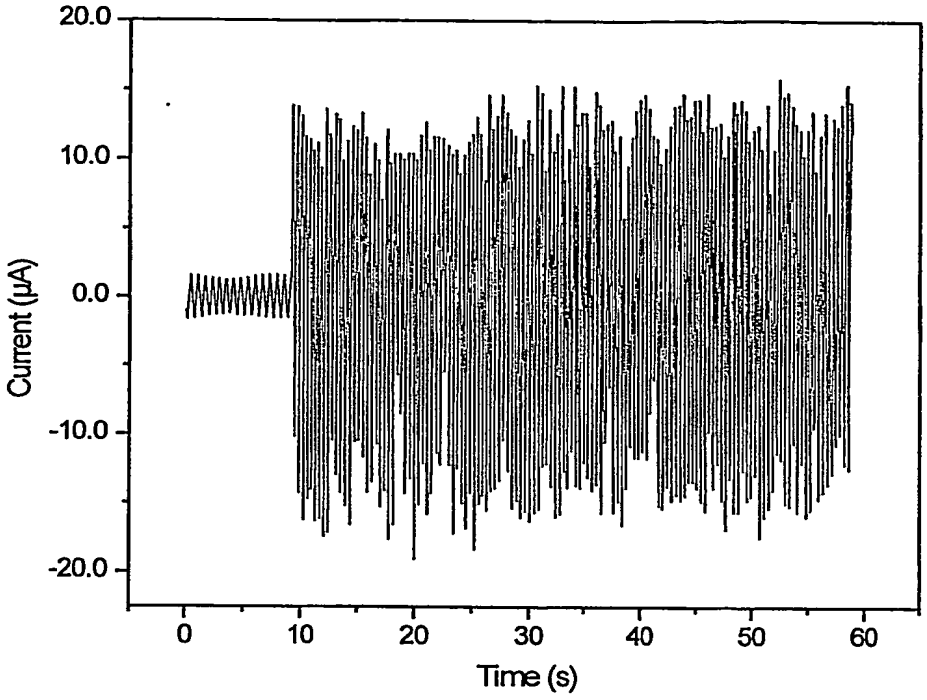


Figure 5. Current pulse output from the Galvanostat.

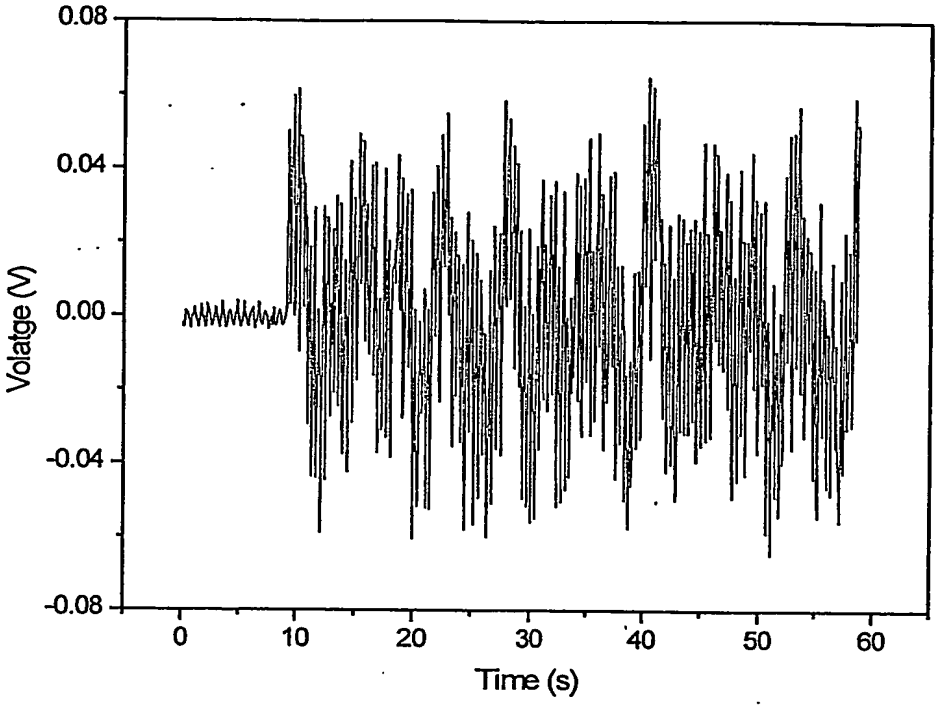
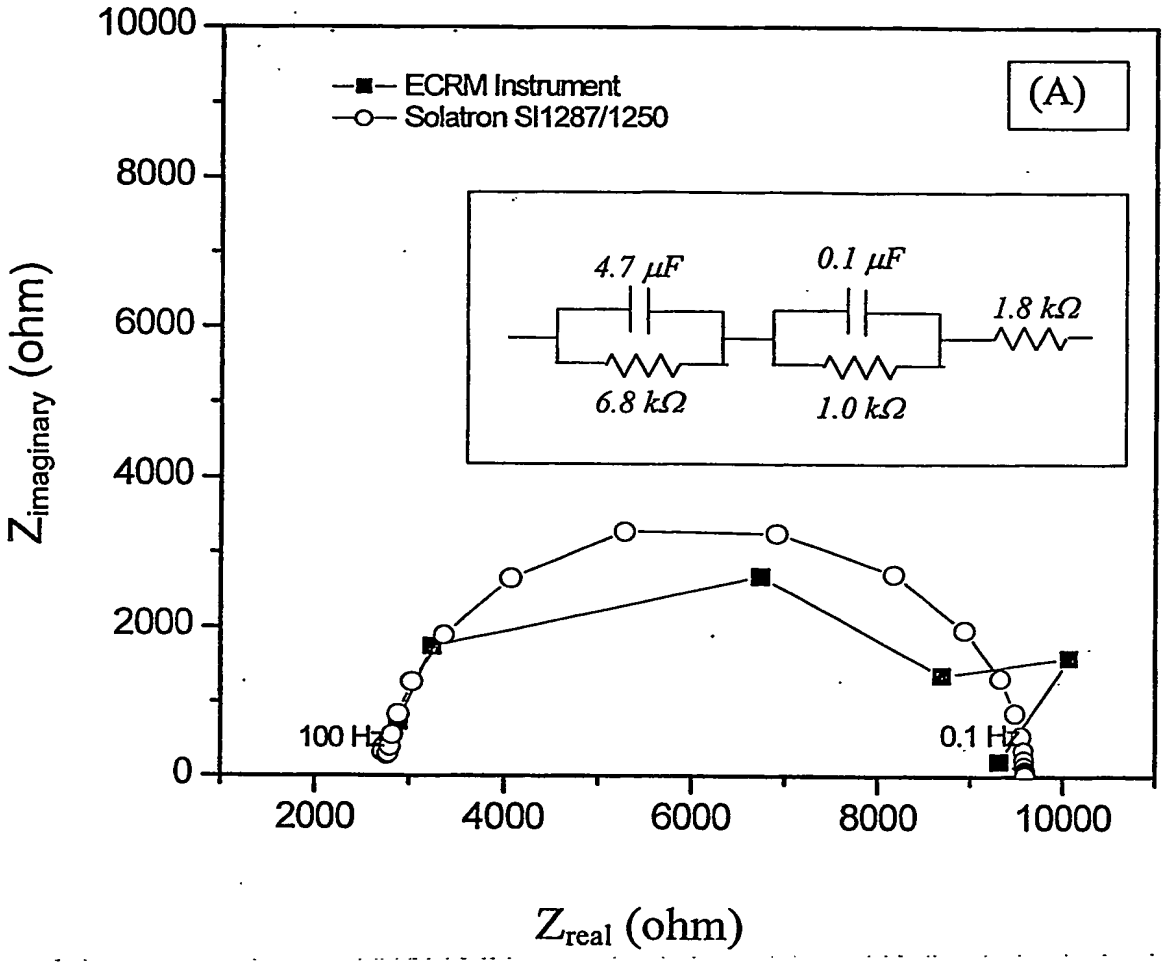
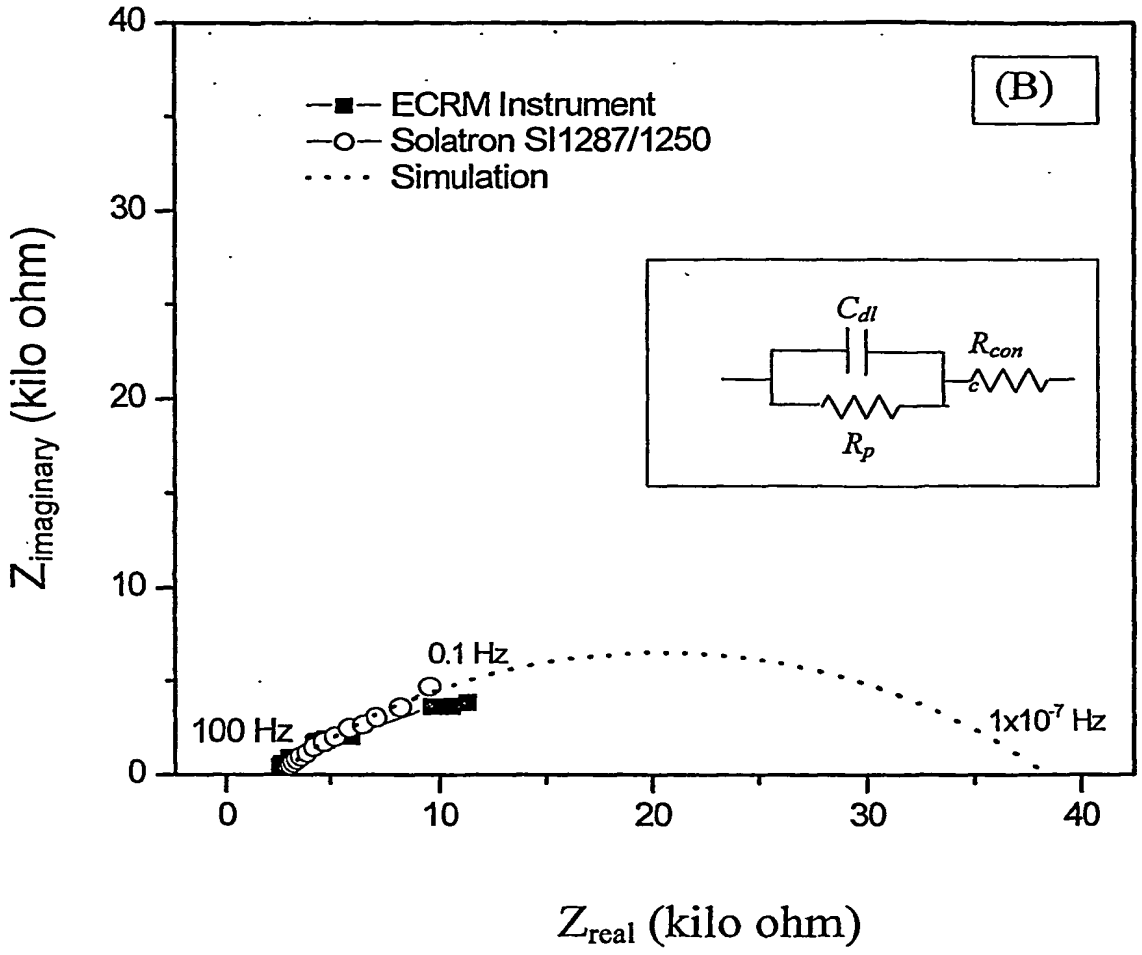


Figure 6. Voltage response by the Electrochemical Cell to the current input shown in Figure 5.



Impedance measured by the Solartron SI 1287/1250 (- o -).
Impedance measured by the inventive instrument (- ■ -).

Figure 7a. Impedance of the Dummy Cell Solartron ECI Test Module 12861. The inset shows the electrical components in Module 12861. Note that the two instruments have measured and identified 6,800 ohms as the difference in the Z_{real} values between 0.1 Hz and 100 Hz. Similarly, the Z_{real} value at 100 Hz is 2,800 ohm, which is the sum of 1,000 ohm and 1,800 ohm. In a real corrosion cell, the Z_{real} value at the high-frequency limit (100 Hz) would represent the electrolyte resistance (or the concrete resistance R_{conc}), and the difference in the Z_{real} values between the low- and high-frequency limits (0.1 Hz and 100 Hz) would represent the R_p.



Impedance measured by the Solartron SI 1287/1250 (- o -).
Impedance measured by the inventive instrument (- ■ -).

Figure 7B. Impedance of the Electrochemical Cell with steel embedded in concrete.